# Consultancy service for Preparation of Detailed Project Report for Construction of Elevated Corridors


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## DETAILED PROJECT REPORT

**Construction of Grade Separators at Pipeline Road from West of Chord Road to Outer Ring Road in Mahalakshmi Layout under Engineering, Procurement & Construction (EPC) Mode on Lumpsum, Turkey with allowable Price Escalation using Ultra High-Performance Fiber Reinforced Concrete (UHPFRC) - based structures including 10 years of maintenance**

## Volume-II

## Design Report


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# Package-3D

# West Chord Road to Outer Ring Road via Pipeline Road

## Horizontal Alignment Report

## Summary of Horizontal Alignment Report (Package-3d)

| SL No | Chainage at HIP | Easting | Northing | Radius | Deflection Angle (Curve) | Deflection Angle (Transition) | Total Deviation Angle | Ts | Es | Ls | Lc | L Total | Start of Transition | Start of Circular arc | End of Circular arc | End of Transition | Hand of Curve | Speed (V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Tangent Length | External Distance | Transition Length | Arc Length | Total Curve Length | | | | | | |
| | (m) | (m) | (m) | (m) | (Deg) | (Deg) | (Deg) | (m) | (m) | (m) | (m) | (m) | (m) | (m) | (m) | (m) | | (Kmph) |
| 1 | Elevated Corridor: West of Chord Road to Outer Ring Road via Pipeline Road | | | | | | | | | | | | | | | | | |
| 1 | 0+000.000 | 776441.728 | 1439179.890 | | | | | | | | | | | | | | | |
| 2 | 0+058.205 | 776390.319 | 1439152.597 | 1200 | 2.016 | 0 | 2.016 | 21.111 | 0.186 | 0 | 42.218 | 42.218 | 0 | 0+037.093 | 0+079.312 | 0 | Right | 80 |
| 3 | 0+549.741 | 775948.329 | 1438937.521 | 2000 | 0.609 | 0 | 0.609 | 10.628 | 0.028 | 0 | 21.255 | 21.255 | 0 | 0+539.114 | 0+560.369 | 0 | Right | 80 |
| 4 | 0+699.412 | 775813.058 | 1438873.466 | 2000 | 1.352 | 0 | 1.352 | 23.595 | 0.139 | 0 | 47.189 | 47.189 | 0 | 0+675.816 | 0+723.005 | 0 | Left | 80 |
| 5 | 0+899.651 | 775634.153 | 1438783.522 | 2000 | 2.666 | 0 | 2.666 | 46.536 | 0.541 | 0 | 93.054 | 93.054 | 0 | 0+853.116 | 0+946.170 | 0 | Right | 80 |
| 6 | 1+063.043 | 775484.901 | 1438716.993 | 600 | 8.557 | 0 | 8.557 | 44.887 | 1.677 | 0 | 89.607 | 89.607 | 0 | 1+018.156 | 1+107.763 | 0 | Right | 80 |
| 7 | 1+202.288 | 775350.540 | 1438679.811 | 2000 | 1.524 | 0 | 1.524 | 26.601 | 0.177 | 0 | 53.199 | 53.199 | 0 | 1+175.687 | 1+228.885 | 0 | Right | 80 |
| 8 | 1+547.796 | 775015.211 | 1438596.551 | 2000 | 1.161 | 0 | 1.161 | 20.273 | 0.103 | 0 | 40.544 | 40.544 | 0 | 1+527.523 | 1+568.067 | 0 | Left | 80 |
| 9 | 1+718.775 | 774850.138 | 1438551.993 | 2000 | 1.883 | 0 | 1.883 | 32.874 | 0.270 | 0 | 65.742 | 65.742 | 0 | 1+685.901 | 1+751.643 | 0 | Right | 80 |
| 10 | 1+997.187 | 774579.100 | 1438488.310 | 2000 | 1.089 | 0 | 1.089 | 19.013 | 0.090 | 0 | 38.024 | 38.024 | 0 | 1+978.175 | 2+016.199 | 0 | Left | 80 |
| 11 | 2+850.000 | | | | | | | | | | | | | | | | | |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| | |
| Element 1 Straight | |
| | |
| Bearing | 242 02 10.594 |
| Length | 37.093 |
| Begin on Straight Chainage | 0+000.000 |
| Begin on Straight X | 776441.728 |
| Begin on Straight Y | 1439179.89 |
| Straight End Chainage | 0+037.093 |
| Straight End X | 776408.965 |
| Straight End Y | 1439162.497 |
| | |
| Element 2 Arc | |
| | |
| Intersection Point Chainage | 0+058.205 |
| Intersection Point X | 776390.319 |
| Intersection Point Y | 1439152.597 |
| External | 0.186 |
| Tangent | 21.111 |
| Arc Length | 42.218 |
| Middle Ordinate | 0.186 |
| Chord Length | 42.216 |
| Chord Bearing | 243 02 38.989 |
| Arc Start Chainage | 0+037.093 |
| Arc Start X | 776408.965 |
| Arc Start Y | 1439162.497 |
| Arc End Chainage | 0+079.312 |
| Arc End X | 776371.336 |
| Arc End Y | 1439143.36 |
| Radius | 1200 |
| Hand of Arc | Right |
| Included Angle | 02 00 56.791 |
| Arc Centre X | 775846.27 |
| Arc Centre Y | 1440222.39 |
| | |
| Element 3 Straight | |
| | |
| Bearing | 244 03 07.385 |
| Length | 459.802 |
| Straight Start Chainage | 0+079.312 |
| Straight Start X | 776371.336 |
| Straight Start Y | 1439143.36 |
| Straight End Chainage | 0+539.114 |
| Straight End X | 775957.885 |
| Straight End Y | 1438942.172 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| | |
| Element 4 Arc | |
| | |
| Intersection Point Chainage | 0+549.741 |
| Intersection Point X | 775948.329 |
| Intersection Point Y | 1438937.521 |
| External | 0.028 |
| Tangent | 10.628 |
| Arc Length | 21.255 |
| Middle Ordinate | 0.028 |
| Chord Length | 21.255 |
| Chord Bearing | 244 21 23.438 |
| Arc Start Chainage | 0+539.114 |
| Arc Start X | 775957.885 |
| Arc Start Y | 1438942.172 |
| Arc End Chainage | 0+560.369 |
| Arc End X | 775938.724 |
| Arc End Y | 1438932.973 |
| Radius | 2000 |
| Hand of Arc | Right |
| Included Angle | 00 36 32.106 |
| Arc Centre X | 775082.776 |
| Arc Centre Y | 1440740.555 |
| | |
| Element 5 Straight | |
| | |
| Bearing | 244 39 39.491 |
| Length | 115.447 |
| Straight Start Chainage | 0+560.369 |
| Straight Start X | 775938.724 |
| Straight Start Y | 1438932.973 |
| Straight End Chainage | 0+675.816 |
| Straight End X | 775834.383 |
| Straight End Y | 1438883.565 |
| | |
| Element 6 Arc | |
| | |
| Intersection Point Chainage | 0+699.412 |
| Intersection Point X | 775813.058 |
| Intersection Point Y | 1438873.466 |
| External | 0.139 |
| Tangent | 23.595 |
| Arc Length | 47.189 |
| Middle Ordinate | 0.139 |
| Chord Length | 47.188 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| Chord Bearing | 243 59 06.152 |
| Arc Start Chainage | 0+675.816 |
| Arc Start X | 775834.383 |
| Arc Start Y | 1438883.565 |
| Arc End Chainage | 0+723.005 |
| Arc End X | 775791.977 |
| Arc End Y | 1438862.868 |
| Radius | 2000 |
| Hand of Arc | Left |
| Included Angle | 01 21 06.679 |
| Arc Centre X | 776690.331 |
| Arc Centre Y | 1437075.982 |
| | |
| Element 7 Straight | |
| | |
| Bearing | 243 18 32.812 |
| Length | 130.111 |
| Straight Start Chainage | 0+723.005 |
| Straight Start X | 775791.977 |
| Straight Start Y | 1438862.868 |
| Straight End Chainage | 0+853.116 |
| Straight End X | 775675.73 |
| Straight End Y | 1438804.425 |
| | |
| Element 8 Arc | |
| | |
| Intersection Point Chainage | 0+899.651 |
| Intersection Point X | 775634.153 |
| Intersection Point Y | 1438783.522 |
| External | 0.541 |
| Tangent | 46.536 |
| Arc Length | 93.054 |
| Middle Ordinate | 0.541 |
| Chord Length | 93.046 |
| Chord Bearing | 244 38 31.269 |
| Arc Start Chainage | 0+853.116 |
| Arc Start X | 775675.73 |
| Arc Start Y | 1438804.425 |
| Arc End Chainage | 0+946.170 |
| Arc End X | 775591.649 |
| Arc End Y | 1438764.576 |
| Radius | 2000 |
| Hand of Arc | Right |
| Included Angle | 02 39 56.913 |
| Arc Centre X | 774777.377 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| Arc Centre Y | 1440591.311 |
| | |
| Element 9 Straight | |
| | |
| Bearing | 245 58 29.726 |
| Length | 71.986 |
| Straight Start Chainage | 0+946.170 |
| Straight Start X | 775591.649 |
| Straight Start Y | 1438764.576 |
| Straight End Chainage | 1+018.156 |
| Straight End X | 775525.899 |
| Straight End Y | 1438735.268 |
| | |
| Element 10 Arc | |
| | |
| Intersection Point Chainage | 1+063.043 |
| Intersection Point X | 775484.901 |
| Intersection Point Y | 1438716.993 |
| External | 1.677 |
| Tangent | 44.887 |
| Arc Length | 89.607 |
| Middle Ordinate | 1.672 |
| Chord Length | 89.524 |
| Chord Bearing | 250 15 12.013 |
| Arc Start Chainage | 1+018.156 |
| Arc Start X | 775525.899 |
| Arc Start Y | 1438735.268 |
| Arc End Chainage | 1+107.763 |
| Arc End X | 775441.64 |
| Arc End Y | 1438705.021 |
| Radius | 600 |
| Hand of Arc | Right |
| Included Angle | 08 33 24.574 |
| Arc Centre X | 775281.618 |
| Arc Centre Y | 1439283.288 |
| | |
| Element 11 Straight | |
| | |
| Bearing | 254 31 54.300 |
| Length | 67.924 |
| Straight Start Chainage | 1+107.763 |
| Straight Start X | 775441.64 |
| Straight Start Y | 1438705.021 |
| Straight End Chainage | 1+175.687 |
| Straight End X | 775376.177 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| Straight End Y | 1438686.906 |
| | |
| Element 12 Arc | |
| | |
| Intersection Point Chainage | 1+202.288 |
| Intersection Point X | 775350.54 |
| Intersection Point Y | 1438679.811 |
| External | 0.177 |
| Tangent | 26.601 |
| Arc Length | 53.199 |
| Middle Ordinate | 0.177 |
| Chord Length | 53.197 |
| Chord Bearing | 255 17 37.548 |
| Arc Start Chainage | 1+175.687 |
| Arc Start X | 775376.177 |
| Arc Start Y | 1438686.906 |
| Arc End Chainage | 1+228.885 |
| Arc End X | 775324.723 |
| Arc End Y | 1438673.401 |
| Radius | 2000 |
| Hand of Arc | Right |
| Included Angle | 01 31 26.497 |
| Arc Centre X | 774842.768 |
| Arc Centre Y | 1440614.462 |
| | |
| Element 13 Straight | |
| | |
| Bearing | 256 03 20.797 |
| Length | 298.638 |
| Straight Start Chainage | 1+228.885 |
| Straight Start X | 775324.723 |
| Straight Start Y | 1438673.401 |
| Straight End Chainage | 1+527.523 |
| Straight End X | 775034.886 |
| Straight End Y | 1438601.436 |
| | |
| Element 14 Arc | |
| | |
| Intersection Point Chainage | 1+547.796 |
| Intersection Point X | 775015.211 |
| Intersection Point Y | 1438596.551 |
| External | 0.103 |
| Tangent | 20.273 |
| Arc Length | 40.544 |
| Middle Ordinate | 0.103 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| Chord Length | 40.543 |
| Chord Bearing | 255 28 30.111 |
| Arc Start Chainage | 1+527.523 |
| Arc Start X | 775034.886 |
| Arc Start Y | 1438601.436 |
| Arc End Chainage | 1+568.067 |
| Arc End X | 774995.638 |
| Arc End Y | 1438591.268 |
| Radius | 2000 |
| Hand of Arc | Left |
| Included Angle | 01 09 41.372 |
| Arc Centre X | 775516.84 |
| Arc Centre Y | 1436660.374 |
| | |
| Element 15 Straight | |
| | |
| Bearing | 254 53 39.424 |
| Length | 117.834 |
| Straight Start Chainage | 1+568.067 |
| Straight Start X | 774995.638 |
| Straight Start Y | 1438591.268 |
| Straight End Chainage | 1+685.901 |
| Straight End X | 774881.876 |
| Straight End Y | 1438560.56 |
| | |
| Element 16 Arc | |
| | |
| Intersection Point Chainage | 1+718.775 |
| Intersection Point X | 774850.138 |
| Intersection Point Y | 1438551.993 |
| External | 0.27 |
| Tangent | 32.874 |
| Arc Length | 65.742 |
| Middle Ordinate | 0.27 |
| Chord Length | 65.739 |
| Chord Bearing | 255 50 09.496 |
| Arc Start Chainage | 1+685.901 |
| Arc Start X | 774881.876 |
| Arc Start Y | 1438560.56 |
| Arc End Chainage | 1+751.643 |
| Arc End X | 774818.135 |
| Arc End Y | 1438544.474 |
| Radius | 2000 |
| Hand of Arc | Right |
| Included Angle | 01 53 00.143 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| Arc Centre X | 774360.674 |
| Arc Centre Y | 1440491.453 |
| | |
| Element 17 Straight | |
| | |
| Bearing | 256 46 39.568 |
| Length | 226.532 |
| Straight Start Chainage | 1+751.643 |
| Straight Start X | 774818.135 |
| Straight Start Y | 1438544.474 |
| Straight End Chainage | 1+978.175 |
| Straight End X | 774597.609 |
| Straight End Y | 1438492.659 |
| | |
| Element 18 Arc | |
| | |
| Intersection Point Chainage | 1+997.187 |
| Intersection Point X | 774579.1 |
| Intersection Point Y | 1438488.31 |
| External | 0.09 |
| Tangent | 19.013 |
| Arc Length | 38.024 |
| Middle Ordinate | 0.09 |
| Chord Length | 38.023 |
| Chord Bearing | 256 13 58.821 |
| Arc Start Chainage | 1+978.175 |
| Arc Start X | 774597.609 |
| Arc Start Y | 1438492.659 |
| Arc End Chainage | 2+016.199 |
| Arc End X | 774560.678 |
| Arc End Y | 1438483.61 |
| Radius | 2000 |
| Hand of Arc | Left |
| Included Angle | 01 05 21.492 |
| Arc Centre X | 775055.07 |
| Arc Centre Y | 1436545.679 |
| | |
| Element 19 Straight | |
| | |
| Bearing | 255 41 18.075 |
| Length | 1074.459 |
| Straight Start Chainage | 2+016.199 |
| Straight Start X | 774560.678 |
| Straight Start Y | 1438483.61 |
| Straight End Chainage | 3+090.658 |

| HORIZONTAL ALIGNMENT REPORT | |
|---|---|
| Straight End X | 773519.564 |
| Straight End Y | 1438218.008 |
| | |

# Package-3D

# West Chord Road to Outer Ring Road via Pipeline Road

## Vertical Alignment Report

| Summary of Vertical Alignment Report (Package-3d) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SL No | Chainage at PVI | Level of PVI | Length of Curve | Type of Curve | Grade in | Grade out | Grade Difference | Radius | Chainage( m) | | Level (m) | | Level of road at PVI | Middle Ordinate |
| | (m) | (m) | (m) | | % | % | % | (m) | Start of Curve | End of Curve | Start of Curve | Endof Curve | (m) | |
| 1 | Elevated Corridor: West of Chord Road to Outer Ring Road via Pipeline Road | | | | | | | | | | | | | |
| 1 | 0+000.000 | 918.064 | | | | | | | | | | | | |
| 2 | 0+275.994 | 911.536 | 250 | Sag | -2.365 | 1.600 | 3.965 | 6304.606 | 0+150.994 | 0+400.994 | 914.492 | 913.536 | 912.775 | 1.239 |
| 3 | 1+337.483 | 928.519 | 900 | Hog | 1.600 | -5.000 | 6.600 | -13636.349 | 0+887.483 | 1+787.483 | 921.319 | 906.019 | 921.094 | -7.425 |
| 4 | 2+047.208 | 893.033 | 200 | Sag | -5.000 | -2.500 | 2.500 | 7999.927 | 1+947.208 | 2+147.208 | 898.033 | 890.533 | 893.658 | 0.625 |
| 5 | 2+283.026 | 887.138 | 250 | Sag | -2.500 | -0.028 | 2.472 | 10114.311 | 2+158.026 | 2+408.026 | 890.263 | 887.102 | 887.910 | 0.772 |
| 6 | 2+285.000 | | | | | | | | | | | | | |

| VERTICAL ALIGNMENT REPORT | |
|---|---|
| Element 1 Grade | |
| | |
| Gradient | -2.365 |
| Gradient Length | 150.994 |
| Begin on Gradient Chainage | 0+000.000 |
| Begin on Gradient Level | 918.064 |
| Gradient End Chainage | 0+150.994 |
| Gradient End Level | 914.492 |
| | |
| Element 2 Vertical Curve | |
| | |
| IP Chainage | 0+275.994 |
| IP Level | 911.536 |
| Middle Ordinate | 1.239 |
| Algebraic Difference | 3.965 |
| Curve Start Gradient | -2.365 |
| Curve End Gradient | 1.6 |
| High/Low Chainage | 0+300.121 |
| High/Low Level | 912.729 |
| Curve Length | 250 |
| Vertical Radius | 6304.606 |
| M Value | 1.586 |
| K Value | 63.046 |
| Curve Type | Sag |
| Curve Start Chainage | 0+150.994 |
| Curve Start Level | 914.492 |
| Curve End Chainage | 0+400.994 |
| Curve End Level | 913.536 |
| | |
| Element 3 Grade | |
| | |
| Gradient | 1.6 |
| Gradient Length | 486.488 |
| Gradient Start Chainage | 0+400.994 |
| Grade Start Level | 913.536 |
| Gradient End Chainage | 0+887.483 |
| Gradient End Level | 921.319 |
| | |
| Element 4 Vertical Curve | |
| | |
| IP Chainage | 1+337.483 |
| IP Level | 928.519 |
| Middle Ordinate | -7.425 |
| Algebraic Difference | -6.6 |
| Curve Start Gradient | 1.6 |

| VERTICAL ALIGNMENT REPORT | |
|---|---|
| Curve End Gradient | -5 |
| High/Low Chainage | 1+105.664 |
| High/Low Level | 923.065 |
| Curve Length | 900 |
| Vertical Radius | -13636.349 |
| M Value | -0.733 |
| K Value | 136.363 |
| Curve Type | Hog |
| Sight Distance | 234.787 |
| Curve Start Chainage | 0+887.483 |
| Curve Start Level | 921.319 |
| Curve End Chainage | 1+787.483 |
| Curve End Level | 906.019 |
| | |
| Element 5 Grade | |
| | |
| Gradient | -5 |
| Gradient Length | 159.725 |
| Gradient Start Chainage | 1+787.483 |
| Grade Start Level | 906.019 |
| Gradient End Chainage | 1+947.208 |
| Gradient End Level | 898.033 |
| | |
| Element 6 Vertical Curve | |
| | |
| IP Chainage | 2+047.208 |
| IP Level | 893.033 |
| Middle Ordinate | 0.625 |
| Algebraic Difference | 2.5 |
| Curve Start Gradient | -5 |
| Curve End Gradient | -2.5 |
| Curve Length | 200 |
| Vertical Radius | 7999.927 |
| M Value | 1.25 |
| K Value | 79.999 |
| Curve Type | Sag |
| Curve Start Chainage | 1+947.208 |
| Curve Start Level | 898.033 |
| Curve End Chainage | 2+147.208 |
| Curve End Level | 890.533 |
| | |
| Element 7 Grade | |
| | |
| Gradient | -2.5 |
| Gradient Length | 10.818 |

| VERTICAL ALIGNMENT REPORT | |
|---|---|
| Gradient Start Chainage | 2+147.208 |
| Grade Start Level | 890.533 |
| Gradient End Chainage | 2+158.026 |
| Gradient End Level | 890.263 |
| | |
| Element 8 Vertical Curve | |
| | |
| IP Chainage | 2+283.026 |
| IP Level | 887.138 |
| Middle Ordinate | 0.772 |
| Algebraic Difference | 2.472 |
| Curve Start Gradient | -2.5 |
| Curve End Gradient | -0.028 |
| Curve Length | 250 |
| Vertical Radius | 10114.311 |
| M Value | 0.989 |
| K Value | 101.143 |
| Curve Type | Sag |
| Curve Start Chainage | 2+158.026 |
| Curve Start Level | 890.263 |
| Curve End Chainage | 2+408.026 |
| Curve End Level | 887.102 |
| | |
| Element 9 Grade | |
| | |
| Gradient | -0.028 |
| Gradient Length | 6775.798 |
| Gradient Start Chainage | 2+408.026 |
| Grade Start Level | 887.102 |
| End on Gradient Chainage | 9+183.824 |
| Gradient End Level | 885.189 |